



## The Texas Youth Fitness Study

Looking at school policies as they relate to physical fitness and academic variables

### **SUMMARY**

In partnership with three universities, the [Cooper Institute](#), Dallas, completed the Texas Youth Fitness Study from 2008 to 2009. The study explored three key questions:

- Is physical fitness associated with academic performance?
- Can physical education teachers collect high-quality information on student fitness?
- Are school policies and environments associated with youth fitness?

To answer those questions, researchers analyzed data from fitness tests of students in grades 3 to 12 across the state. School districts must collect and submit these data to the Texas Education Agency.

### **Key Findings**

In a 2010 supplement to the *Research Quarterly for Exercise and Sport*,<sup>1</sup> project researchers reported:

- There are small but consistently positive associations between fitness and academic achievement and attendance. There is an inverse association between fitness and negative school incidents.
- Teachers can conduct reliable and valid assessments of student fitness. Parents, teachers and administrators can trust the information they receive.
- Socioeconomic status plays a role in determining differences in student fitness across schools and deserves more study.
- Fit adolescents feel confident about their physical abilities and positive about their shape and size.

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<sup>1</sup> *Research Quarterly for Exercise and Sport*, 81(Suppl. 3), 2010.

## Funding

The Robert Wood Johnson Foundation (RWJF) provided a grant of \$476,534 to support this project.

## CONTEXT

Some 19 percent of Texas youth are obese, and 70 percent of those children will become obese adults, experts predict. In response, Texas passed legislation in 2007 that requires schools to provide more opportunities for children in grades K to 8 to engage in physical activity and mandates fitness testing of all children in grades 3 to 12.

School districts must use FITNESSGRAM®, a tool developed by the Cooper Institute that determines whether each child attains a Healthy Fitness Zone in the three components of health-related physical fitness:

- Aerobic capacity
- Body mass index
- Muscular strength and flexibility

Districts must submit the results—aggregated by age, gender and school—to the Texas Education Agency. (Districts do not identify individual students.) The agency, in turn, must examine the relationship between physical fitness and school-level factors, such as student achievement, attendance, obesity and disciplinary problems.

In 2007–08, school districts trained physical education teachers to administer the test to some 2.6 million students. Nearly 85 percent of school districts submitted at least some results to the Texas Education Agency.

The researchers of this project indicate that although other studies have shown a link between student physical fitness and academic achievement, most have not controlled for socioeconomic status or stratified results by grade and district. What's more, many other states are contemplating use of FITNESSGRAM to monitor children's weight and are mandating testing of student fitness, and a few already are doing so. This study aimed to shed light on the validity of such large-scale state testing. In Arkansas and California, such assessments have been instrumental in garnering community support for maintaining and enforcing school physical education policies.

## About the Cooper Institute

Kenneth H. Cooper, M.D., M.P.H, project co-director, founded the Cooper Institute in 1970 to investigate whether physical activity correlates with better health across the human lifespan. Cooper's best seller, *Aerobics*, published in 1968, introduced a new word and a new concept. He is widely credited with popularizing aerobic exercise.

## RWJF's Interest in This Area

The Childhood Obesity team believed that the project advanced the team indicators to improve both state and local school district policies for physical activity and healthy eating. It also advanced the overall strategy by adding to the evidence base on ways to monitor changes in children's healthy weight.

## THE PROJECT

The Texas Youth Fitness Study, a research collaboration between the Cooper Institute and three universities,<sup>2</sup> used the Texas Education Agency dataset and other information collected from schools to answer three key questions:

- ***Is physical fitness associated with academic performance?*** Researchers at Iowa State University compiled data from the statewide fitness assessment and merged them with academic data obtained from the Texas Education Agency to examine associations of fitness and academic variables. This team also provided detailed descriptive data of the status of health-related fitness in Texas. This work was led by Gregory J. Welk, Ph.D., under a \$46,450 subcontract.
- ***Can physical education teachers collect high-quality information on student fitness?*** University of North Texas researchers investigated the reliability and validity of the standardized fitness testing by comparing results from teachers with data obtained from trained experts. The study was conducted by having a sample of youth in grades 3, 5, 7 and 9 complete two trials of tests (conducted two weeks apart) once by the teacher and once by expert testers.

The researchers also trained graduate and undergraduate students to observe teachers administering the tests, and they conducted a focus group with teachers. Scott Martin, Ph.D., and James R. Morrow Jr., Ph.D., led these researchers under a subcontract for \$221,870.

- ***Are school policies and environments associated with youth fitness?*** Researchers at the University of Illinois at Urbana-Champaign examined the factors that influence variability in fitness results across the state. This team relied on responses to an online survey completed by physical education teachers at almost 2,600 Texas schools. The survey asked about school resources and policies and the school environment, as well as the respondents' perceptions of fitness testing. Weimo Zhu, Ph.D., led this research under a subcontract for \$61,114.

The researchers published their findings in 11 articles in a 2010 special supplement to the *Research Quarterly for Exercise and Sport*.<sup>3</sup> The American Alliance for Health, Physical

<sup>2</sup> The three universities are Iowa State University, the University of North Texas and the University of Illinois at Urbana-Champaign.

<sup>3</sup> *Research Quarterly for Exercise and Sport*, 81(Suppl. 3), 2010. Abstract available [online](#). Full text requires a fee.

Education, Recreation and Dance Research Consortium distributed 10,000 copies of the supplement to individuals and libraries; the abstracts are available on [rwjf.org](http://rwjf.org); full text is available for a fee [online](#). The researchers also presented their findings at state and national physical education conferences.

The supplement also includes findings from a study that examined links between fitness and self-esteem, physical competence and body satisfaction among 1,022 Texas middle school students, funded by the National Association of Sport and Physical Education. Project staff included these findings because the RWJF-funded research did not examine psychosocial factors.

## FINDINGS

The researchers cited these findings in the *Research Quarterly for Exercise and Sport*:

In "Distribution of Health-Related Physical Fitness in Texas Youth: A Demographic and Geographic Analysis," Welk and Iowa State researchers reported that:<sup>4</sup>

- **Student cardiovascular fitness declines with age:**
  - Seventy percent of elementary students met Healthy Fitness Zone standards.
  - Forty-six percent of middle school students met those standards.
  - Thirty-four percent of high school students met those standards.

In "The Association of Health-Related Fitness With Indicators of Academic Performance in Texas Schools," Welk and Iowa State researchers reported:<sup>5</sup>

- **Small but consistently positive associations between fitness and academic achievement.** Results were strongest in the middle grades.
- **A positive association between fitness and school attendance.**

In "Reliability and Validity of the FITNESSGRAM®," Morrow, Martin and University of North Texas researchers reported:<sup>6</sup>

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<sup>4</sup> Welk GJ, Meredith MD, Ihmels M and Seeger C. "Distribution of Health-Related Fitness in Texas Youth: A Demographic and Geographic Analysis." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S6–S15, 2010. Abstract available [online](#).

<sup>5</sup> Welk GJ, Jackson AW, Morrow Jr. JR, Haskell WH, Meredith MD and Cooper KH. "The Association of Health-Related Fitness With Indicators of Academic Performance in Texas Schools." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S16–S23, 2010. Abstract available [online](#).

<sup>6</sup> Morrow Jr JR, Martin, SB and Jackson, AW. "Reliability and Validity of the FITNESSGRAM®: Quality of Teacher-Collected Health-Related Fitness Surveillance Data." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S24–S30, 2010. Abstract available [online](#).

- **Teachers can conduct reliable and valid assessments of student fitness.**

Measurements of aerobic capacity and body mass index proved more reliable than measurements of musculoskeletal fitness.

"We found that teachers do a pretty good job," said Morrow. "There are hurdles that have to be overcome, and it is best to have strong administrative and curricula support, but parents, teachers and administrators can trust the data they are getting."

- **The quality of test results does not vary with the age or gender of students, or based on school and local characteristics, such as socioeconomic status.**
- **When teachers receive extra training, their test results are more likely to agree with those of expert testers.**

Despite the high quality of the testing, however, in "Statewide Physical Fitness Testing: Perspectives From the Gym," Martin, Morrow and University of North Texas researchers reported that:<sup>7</sup>

- **Institutional testing proved a challenge for teachers, especially those at middle and high schools.**
- **Teachers were frustrated by barriers to scheduling and managing tests, and by poor fitness facilities and equipment.**
- **The state and districts can improve the quality of the testing by using coursework and in-service time to train testers, ensuring that all schools have adequate physical education equipment, and supporting teachers who test students for fitness.**

In "Physical Education and School Contextual Factors Relating to Students' Achievement and Cross-Grade Differences in Aerobic Fitness and Obesity," Zhu and University of Illinois at Urbana-Champaign researchers reported that:<sup>8</sup>

- **Socioeconomic status and other characteristics of the community played a role in differences in student fitness across schools.** These factors deserve further study.
- **Teacher training, recess time, space for physical activity, a school wellness policy and opportunities for students to practice fitness tests accounted for only a small portion of the differences across schools.**

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<sup>7</sup> Martin SB, Ede, A, Morrow Jr JR and Jackson, AW. "Statewide Physical Fitness Testing: Perspectives From the Gym." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S31–S41, 2010. Abstract available [online](#).

<sup>8</sup> Zhu W, Boiarskaia EA, Welk GJ and Meredith, MD. "Physical Education and School Contextual Factors Relating to Students' Achievement and Cross-Grade Differences in Aerobic Fitness and Obesity." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S53–S64, 2010. Abstract available [online](#).

In "Psychosocial Variables Associated With Body Composition and Cardiorespiratory Fitness in Middle School Students," Greenleaf, Martin and other researchers at the University of North Texas reported:<sup>9</sup>

- **Fit adolescents felt confident about their physical abilities and positive about their shape and size.**
- **Fit girls reported higher self-esteem, less depression and more satisfaction with their bodies.**

## Limitations

The researchers believe that the study's greatest weakness was the use of aggregate data, which the Texas legislation required. "We would like to know the fitness of individual students, their academic achievement and ethnicity and how many days they are absent from school," said Morrow. That information would give a study more power to detect any beneficial effects of fitness on academic achievement.

"While not a limitation, it is important to recognize that this study measures associations, not causal relationships," notes RWJF's Special Advisor for Evaluation Laura Leviton, Ph.D. "Thus, the researchers are not in a position to state that fitness caused academic achievement—both might be caused by other variables."

## Significance to the Field

Numerous smaller studies have examined the relationship between fitness and academic outcomes, according to Morrow. However, "this study, based on a sample from more than 2 million children, confirmed this relationship across a wide variety of schools and districts."

## LESSONS LEARNED

1. **Allow enough time to acquire data.** Working with large datasets can be time consuming, especially when they are housed within a large bureaucracy. "Without our contact at the Texas Education Agency, I doubt we could have gotten these data as easily as we did," said Project Co-Director Marilu Meredith. Project staff at the Cooper Institute also found it useful to tap staff members and researchers with experience working with large datasets.
2. **Anticipate challenges and delays when working with schools.** Anyone hired to enter Texas schools was subject to background and police checks, and each individual had to win clearance from each district. Schools also often postponed or canceled

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<sup>9</sup> Greenleaf CA, Petrie TA and Martin SB. "Psychosocial Variables Associated With Body Composition and Cardiorespiratory Fitness in Middle School Students." *Research Quarterly for Exercise and Sport*, 81(Suppl. 3): S65–S74, 2010. Abstract available [online](#).

appointments with researchers owing to special events, snow days, swine flu and state tests. As a result, fewer schools, teachers and students participated in the study than anticipated. (Researcher/James Morrow)

## **AFTERWARD**

Project Co-Director Cooper credits findings from the project with spawning a wider U.S. and international interest in FITNESSGRAM, and with leveraging funding to promote its use. For example, the National Football League (NFL) awarded \$1.8 million to the Cooper Institute to establish training and testing programs using FITNESSGRAM in the 32 NFL markets.

The next step is for states and schools to provide interventions that encourage students to be more physically active, such as through after-school programs that engage students who do not participate in organized sports, according to Cooper.

As of January 2011, Texas was considering legislation to support further collection of fitness data in schools, including information on individual students.

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## BIBLIOGRAPHY

(Current as of date of the report; as provided by the grantee organization; not verified by RWJF; items not available from RWJF.)

### Articles

Morrow, JR, Jr, & Ede, A. "Statewide Physical Fitness Testing: A BIG Waist or a BIG Waste?" *Research Quarterly for Exercise and Sport*, 80, 696–701, 2009.

### Journal Supplement

*Research Quarterly for Exercise and Sport*, 81(Suppl. 3), 2010. Abstracts available [online](#). Articles available for a fee [online](#). Supplement includes:

- Cooper KH. "Reflections on the Texas Youth Evaluation Project and Implications for the Future." S79–S83.
- Cooper KH, Everett D, Meredith MD, Kloster J, Rathbone M, & Read K. "Texas Statewide Assessment of Youth Fitness." Sii–Siv.
- Corbin CB. "Texas Youth Fitness Study: A Commentary." S75–S78.
- Greenleaf CA, Petrie TA, & Martin SB. "Psychological Variables as Predictors of Cardiorespiratory Fitness and Body Composition of Middle School Students." S65–S74.
- Martin SB, Ede, A, Morrow, JR, Jr, & Jackson, AW. "Statewide Physical Fitness Testing: Perspectives from the Gym." S31–S41.
- Morrow JR, Jr, Martin, SB, & Jackson, AW. "Reliability and Validity of the FITNESSGRAM®: Quality of Teacher Collected Health-related Fitness Surveillance Data." S24–S30.
- Morrow JR, Jr, Martin, SB, Welk, GJ, Zhu, W, & Meredith, MD. "Overview of the Texas Youth Fitness Study." S1–S5.
- Welk GJ, Jackson AW, Morrow JR, Jr, Haskell WH, Meredith MD, & Cooper KH. "The Association of Health-Related Fitness With Indicators of Academic Performance in Texas Schools." S16–S23.
- Welk GJ, Meredith MD, Ihmels M, & Seeger C. "Distribution of Health-Related Fitness in Texas Youth: A Demographic and Geographic Analysis." S6–S15.
- Zhu W, Boiarskaia EA, Welk GJ, & Meredith, MD. "Physical Education and School Contextual Factors Relating to Students' Achievement and Cross-Grade Differences in Aerobic Fitness and Obesity." S53–S64.
- Zhu W, Welk GJ, Meredith MD, & Boiarskaia EA. "A Survey of Physical Education Programs and Policies in Texas Schools." S42–S52.

## Meetings & Conferences

### ***Presentations***

Martin SB, Morrow JR Jr, & Jackson AW. "Reliability and validity of the FITNESSGRAM®: Quality of teacher collected health surveillance data." Poster presented at the *American College of Sports Medicine Conference*, Baltimore, MD. *Medicine and Science in Sports and Exercise*, 41(5), Suppl. S502. (Abstract), June 2010.

Morrow JR Jr. "Statewide physical fitness testing: BIG waist or BIG waste?" Fourth Annual *Research Quarterly for Exercise and Sport Lecture*. *Research Quarterly for Exercise and Sport*, 80(Suppl.), A-2. (Abstract), 2009.